US 20190073944A1

(19) United States
(12) Patent Application Publication (10) Pub. No.: US 2019/0073944 A1
Li (43) Pub. Date: Mar. 7, 2019

(54) **MICRO LIGHT EMITTING DIODE DISPLAY PANEL AND DRIVING METHOD THEREOF**

(71) Applicant: **PlayNitride Inc.**, Tainan City (TW)

(72) Inventor: **Yu-Chu Li**, Tainan City (TW)

(73) Assignee: **PlayNitride Inc.**, Tainan City (TW)

(21) Appl. No.: **16/121,634**

(22) Filed: **Sep. 5, 2018**

(30) **Foreign Application Priority Data**

Sep. 7, 2017 (TW) 106130555

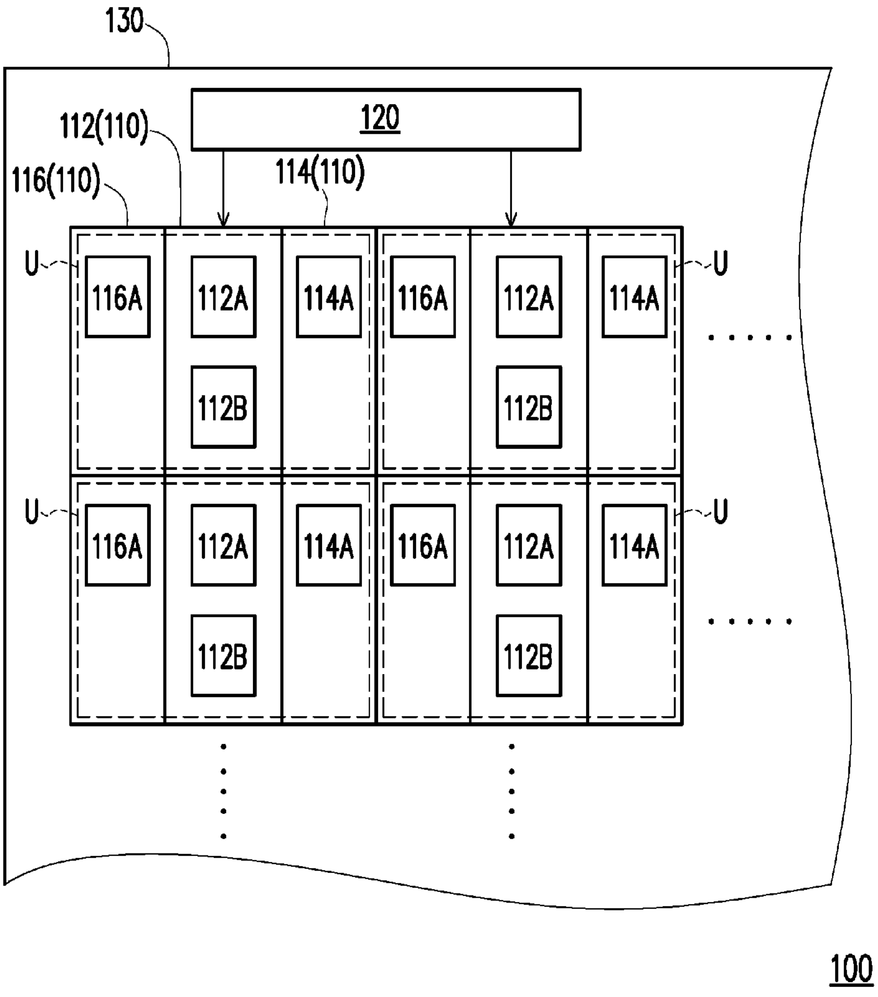
Publication Classification

(51) **Int. Cl.**
G09G 3/32 (2006.01)
H01L 25/075 (2006.01)
H01L 27/15 (2006.01)
G09G 3/20 (2006.01)

(52) **U.S. Cl.**
CPC ***G09G 3/32*** (2013.01); ***H01L 25/0753*** (2013.01); *G09G 2310/0264* (2013.01); ***G09G 3/2003*** (2013.01); ***H01L 27/156*** (2013.01)

(57) **ABSTRACT**

A micro light emitting diode display panel including a plurality of pixels and a control element is provided. One of the pixels include a first sub-pixel. The first sub-pixel includes two micro light emitting diodes having different light wavelengths and controlled independently. The control element controls driving currents to the two micro light emitting diodes according to a gray level of the first sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the first sub-pixel increases. A driving method of the micro light emitting diode display panel is also provided.



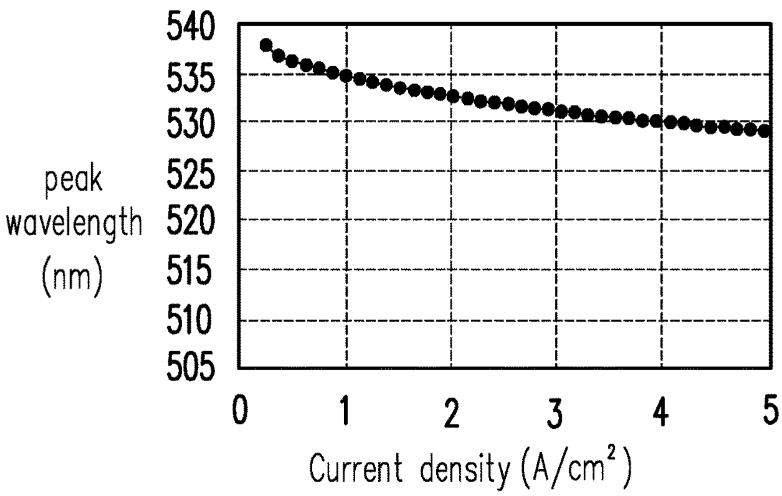

540
535
530
525
520
515
510
505
peak
wavelength
(nm)
0
1
2
3
4
5
Current density (A/cm²)

FIG. 1

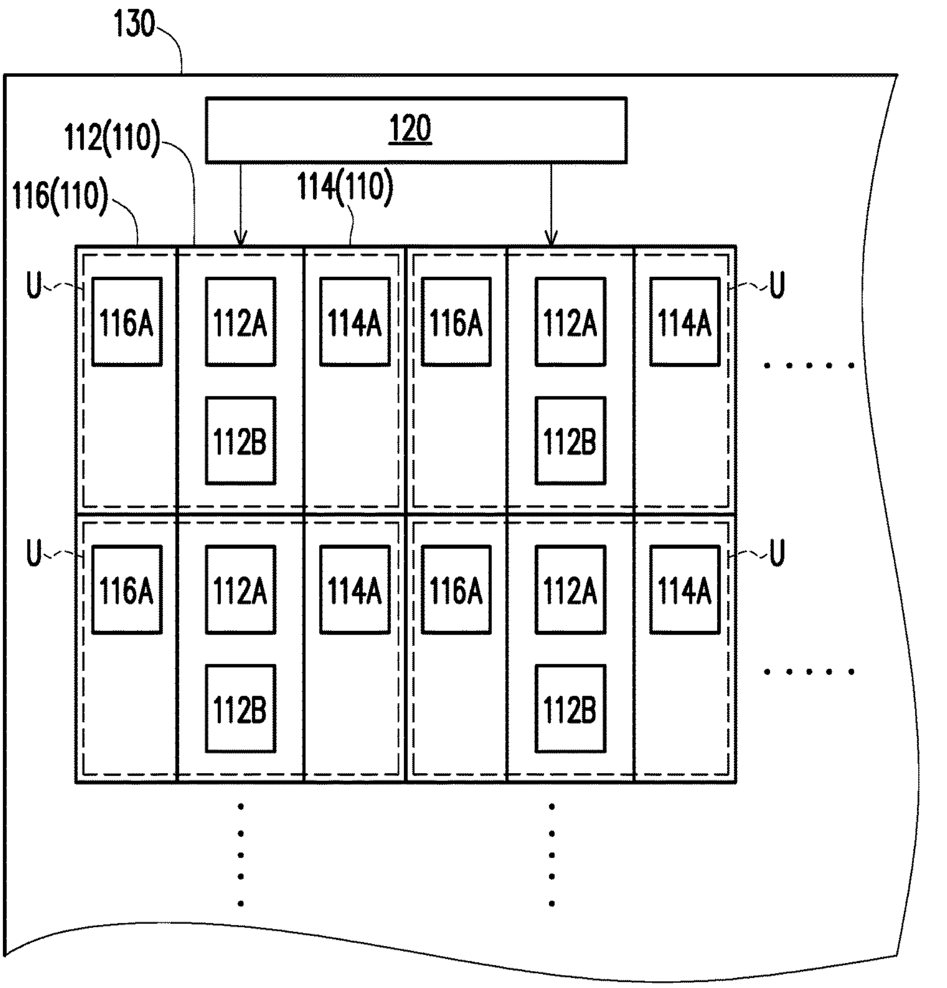

130
120
112(110)
116(110)
114(110)
U
116A
112A
114A
112B
100

FIG. 2

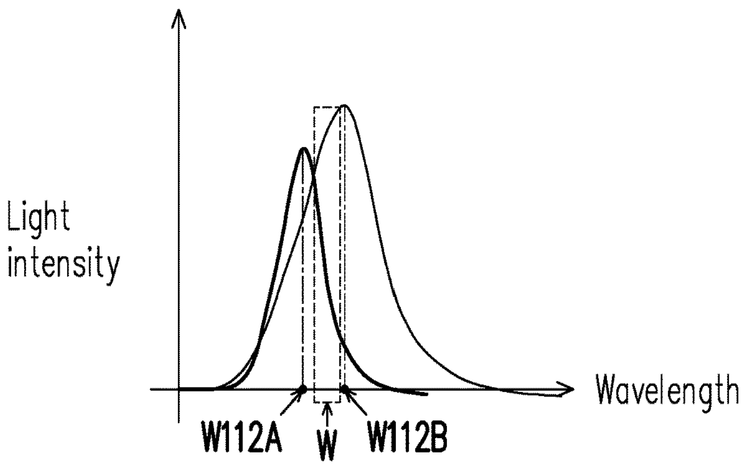


FIG. 3

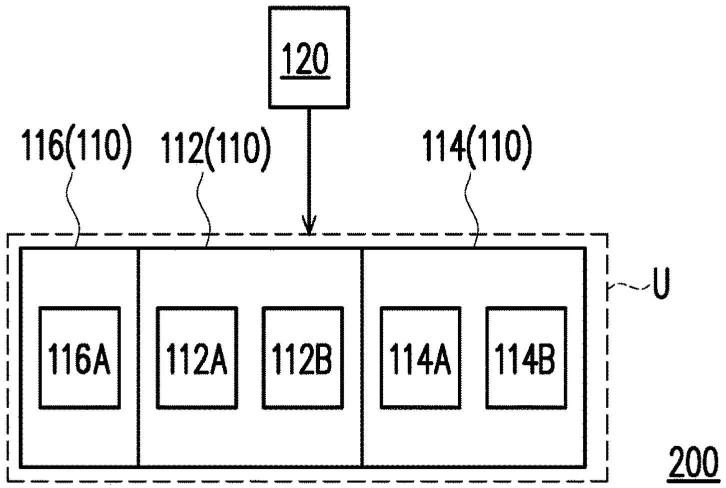


FIG. 4

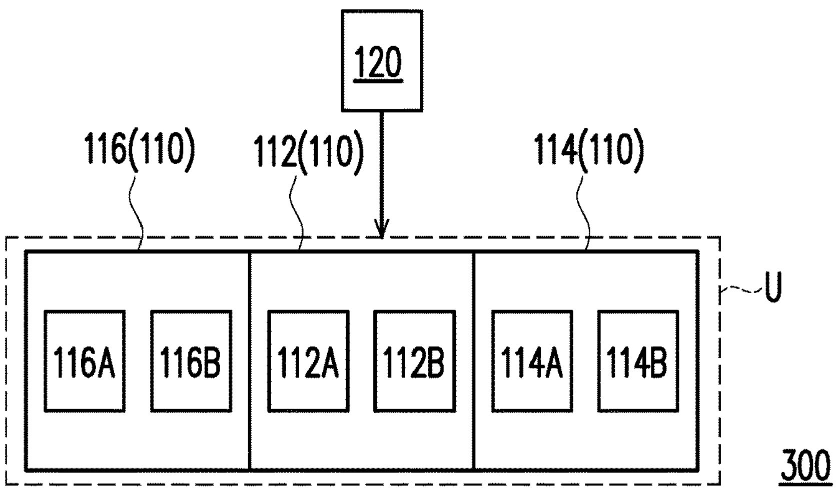


FIG. 5

MICRO LIGHT EMITTING DIODE DISPLAY PANEL AND DRIVING METHOD THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the priority benefit of Taiwan application serial no. 106130555, filed on Sep. 7, 2017. The entirety of the above-mentioned patent application is hereby incorporated by reference herein and made a part of this specification.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] The invention is related to a display panel and a driving method thereof, and particularly to a micro light emitting diode display panel and a driving method thereof.

Description of Related Art

[0003] Along with evolution of photoelectric technologies, the solid-state lighting (e.g., the light emitting diode) has been widely used in various fields such as road illumination, large outdoor board, traffic signals and so on. Recently, a micro light emitting diode display panel has been further developed which uses micro light emitting diodes with different colors as sub-pixels in the display panel.

[0004] In high-resolution or large-size micro light emitting diode display panels, the circuit is easily damaged by heat due to high driving current density. In addition, when using small current to drive the micro light emitting diode, the light wavelength of the micro light emitting diode becomes shorter as the driving current density is increased and the display image may be get worse under the impact of color shift.

[0005] FIG. 1 is a relationship diagram of a current density and a wavelength of a micro light emitting diode. Taking a green micro light emitting diode as an example, as shown in FIG. 1, when using small current (e.g., with current density less than 5 A/cm^2) to drive the green micro light emitting diode, the wavelength of the green micro light emitting diode becomes smaller as the driving current increases; as a result, the green light output by the green micro light emitting diode becomes bluer as the gray level increases (current density increases), and the wavelength of the green light cannot be consistent under different gray levels. Therefore, it is an issue for persons skilled in the art to find out how to improve the color shift problem caused by change of current density.

SUMMARY OF THE INVENTION

[0006] The invention provides a micro light emitting diode display panel and a driving method thereof, which are capable of improving color shift problem caused by change of current density.

[0007] In the invention, a micro light emitting diode display panel includes a plurality of pixels and a control element. One of the pixels include a first sub-pixel. The first sub-pixel includes two micro light emitting diodes having different light wavelengths and controlled independently. The control element controls driving currents to the two micro light emitting diodes according to a gray level of the first sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the first sub-pixel increases.

[0008] In an embodiment of the invention, a light wavelength difference between the two micro light emitting diodes ranges from 1 nm to 10 nm.

[0009] In an embodiment of the invention, current densities of the two micro light emitting diodes are smaller than 3 A/cm^2 respectively.

[0010] In an embodiment of the invention, only the micro light emitting diode with smaller light wavelength of the first sub-pixel emits light when the first sub-pixel is in minimum gray level, and only the micro light emitting diode with larger light wavelength of the first sub-pixel emits light when the first sub-pixel is in maximum gray level.

[0011] In an embodiment of the invention, the first sub-pixel is a green sub-pixel, and the two micro light emitting diodes are green micro light emitting diodes.

[0012] In an embodiment of the invention, the one of the pixels further comprises a second sub-pixel and a third sub-pixel, and the first sub-pixel, the second sub-pixel and the third sub-pixel are with different colors.

[0013] In an embodiment of the invention, the third sub-pixel only comprises one micro light emitting diode, and the second sub-pixel comprises two micro light emitting diodes having different light wavelengths and controlled independently. The control element controls driving currents to the two micro light emitting diodes of the second sub-pixel according to a gray level of the second sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the second sub-pixel increases.

[0014] In an embodiment of the invention, the first sub-pixel, the second sub-pixel and the third sub-pixel are respectively a green sub-pixel, a red sub-pixel and a blue sub-pixel. The red sub-pixel comprises two red micro light emitting diodes controlled independently and with different light wavelengths. The control element controls driving currents to the two red micro light emitting diodes according to a gray level of the red sub-pixel, wherein a ratio of the driving current of the red micro light emitting diode with larger light wavelength to the driving current of the red micro light emitting diode with smaller light wavelength increases as the gray level of the red sub-pixel increases, the blue sub-pixel comprises two blue micro light emitting diodes controlled independently and with different light wavelengths, the control element controls driving currents to the two blue micro light emitting diodes according to a gray level of the blue sub-pixel, wherein a ratio of the driving current of the blue micro light emitting diode with larger light wavelength to the driving current of the blue micro light emitting diode with smaller light wavelength increases as the gray level of the blue sub-pixel increases.

[0015] In the invention, a driving method of a micro light emitting diode display panel includes steps as follow. First of all, a micro light emitting diode display panel is provided, which has a plurality of pixels and at least one control element electrically connected to the plurality of pixels, wherein one of the plurality of pixels include a first sub-pixel. The first sub-pixel includes two micro light emitting diodes controlled independently and with different light wavelengths. Secondly, the control element respectively controls driving currents to the two micro light emitting diodes according to a gray level of the first sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the first sub-pixel increases.

[0016] In an embodiment of the invention, the driving current of the micro light emitting diode with larger light wavelength is I2, and the driving current of the micro light emitting diode with smaller light wavelength is I1. A ratio of I1 to I2 satisfies the equation I1/I2=(W2−W)/(W−W1), wherein W is a target peak wavelength of the first sub-pixel, W1 and W2 are peak wavelengths of the two micro light emitting diodes respectively when the two micro light emitting diodes are driven by I1 and I2, and W1<W2.

[0017] In an embodiment of the invention, current densities of the two micro light emitting diodes are smaller than 3 A/cm^2 respectively.

[0018] In summary, according to the invention, in the micro light emitting diode display panel and the driving method thereof, the first sub-pixel has two micro light emitting diodes with different light wavelengths, and the ratio of the driving currents of the two micro light emitting diodes changes along with the gray level, such that the consistency of the dominant wavelength and light intensity can be maintained under different gray levels. Accordingly, the micro light emitting diode display panel and the driving method thereof are capable of improving color shift problem caused by change of current density in the micro light emitting diodes.

[0019] In order to make the aforementioned features and advantages of the disclosure more comprehensible, embodiments accompanying figures are described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] The accompanying drawings are included to provide a further understanding of the invention, and are incorporated in and constitute a part of this specification. The drawings illustrate embodiments of the invention and, together with the description, serve to explain the principles of the invention.

[0021] FIG. **1** is a relationship diagram of a current density and a wavelength of a micro light emitting diode.

[0022] FIG. **2** is a partial top view of a micro light emitting diode display panel according to a first embodiment of the invention.

[0023] FIG. **3** is a schematic view of a wavelength and light intensity of two micro light emitting diodes in a first sub-pixel of FIG. **2**.

[0024] FIG. **4** and FIG. **5** are respectively partial top views of micro light emitting diode display panels in a second embodiment and a third embodiment of the invention.

DESCRIPTION OF EMBODIMENTS

[0025] FIG. **2** is a partial top view of a micro light emitting diode display panel according to a first embodiment of the invention. Referring to FIG. **2**, a micro light emitting diode display panel **100** in the first embodiment of the invention includes a plurality of pixels U and a control element **120**.

[0026] Each pixel U at least include a first sub-pixel **112**. The first sub-pixel **112** includes a micro light emitting diode **112**A and a micro light emitting diode **112**B. The micro light emitting diode **112**A and the micro light emitting diode **112**B may have the same size so as to facilitate bonding process, which should not be construed as a limitation to the invention.

[0027] The micro light emitting diode **112**A and the micro light emitting diode **112**B are electrically independent of each other and have different light wavelengths. Here, the light wavelength refers to a wavelength corresponding to a maximum light intensity in a spectrum of the micro light emitting diode. FIG. **3** is a schematic view of a wavelength and light intensity of two micro light emitting diodes **112**A and **112**B in the first sub-pixel **112** of FIG. **2** at a target gray level. Referring to FIG. **2** and FIG. **3**, a spectrum of the micro light emitting diode **112**B and a spectrum of the micro light emitting diode **112**A are partially overlapped, and a light wavelength W**112**B of the micro light emitting diode **112**B is larger than a light wavelength W**112**A of the micro light emitting diode **112**A. In an embodiment, a difference of the light wavelength W**112**A of the micro light emitting diode **112**A and the light wavelength W**112**B of the micro light emitting diode **112**B ranges from 1 nm to 10 nm, and preferably ranges from 3 nm to 5 nm.

[0028] The control element **120** is electrically connected to the micro light emitting diode **112**A and the micro light emitting diode **112**B in the first sub-pixel **112**, so as to control driving currents to the micro light emitting diode **112**A and the micro light emitting diode **112**B according to a gray level of the first sub-pixel **112**. In the first embodiment, the control element **120** is disposed on one side of the plurality of pixels U, and the control element **120** controls the driving current to each of the pixels U through connected wires (not shown). In other embodiments, a plurality of control elements **120** may be correspondingly disposed among the pixels U.

[0029] In the first sub-pixel **112**, the ratio of the driving current of the micro light emitting diode **112**B with larger light wavelength to the driving current of the micro light emitting diode **112**A with smaller wavelength increases as the gray level of the first sub-pixel **112** increases.

[0030] Specifically, the driving method of the sub-pixel of the micro light emitting diode display panel **100** satisfies equation 1:

$$I1*(\Delta W2/\Delta W)+I2*(\Delta W1/\Delta W)=I \quad \text{Equation 1}$$

wherein ΔW2=W2−W, ΔW1=W−W1, and ΔW=W2−W1. The symbols used in the above relationship equation represents the following:

W: target peak wavelength (λ_p);

I1 and I2: driving currents of the micro light emitting diode **112**A and the micro light emitting diode **112**B;

I: current required when the first sub-pixel **112** is at the target gray level, wherein I1+I2 is equal to or close to I; and

W1 and W2: peak wavelengths (λ_p) of the micro light emitting diode **112**A and micro light emitting diode **112**B.

In addition, a ratio of I1 to I2 satisfies I1/I2=(W2−W)/(W−W1). Alternately, in another embodiment, W can be the target dominate wavelength (or target centroid wavelength), while W1 and W2 are respectively dominate wavelengths (or centroid wavelengths) of the micro light emitting diode **112**A and micro light emitting diode **112**B.

[0031] According to FIG. **1**, the larger the current density of the micro light emitting diode, the wavelength shifts to the smaller wavelength. In other words, when the gray level of the pixel becomes higher, the wavelength of the light beam emitted by the micro light emitting diode becomes smaller. Therefore, in the first sub-pixel **112** of the embodiment, the driving current ratio of the micro light emitting diode **112**A with smaller light wavelength and the micro light emitting diode **112**B with larger light wavelength decreases as the gray level increases. At low gray level, the dominant wavelength of the light emitted by the first sub-pixel **112** is mainly dominated by the micro light emitting diode **112**A with smaller light wavelength. As the gray level increases, the dominant wavelength of the light emitted by the first sub-pixel **112** may be increased by increasing the current density of the micro light emitting diode **112**B with larger light wavelength. At high gray level, the light wavelength of the light emitted by the first sub-pixel **112** is mainly dominated by the micro light emitting diode **112**B with larger light wavelength, and the light wavelength of the light emitted by the first sub-pixel **112** may be adjusted by the micro light emitting diode **112**A with smaller light wavelength. In an embodiment, only the micro light emitting diode **112**A with smaller light wavelength of the first sub-pixel **112** emits light when the first sub-pixel **112** is in minimum gray level (darkest). In addition, only the micro light emitting diode **112**B with larger light wavelength of the first sub-pixel **112** emits light when the first sub-pixel **112** is in maximum gray level (brightest).

[0032] Because of disposing two micro light emitting diodes with different wavelength in one of the first sub-pixel **112**, the dominant wavelength can be controlled by changing the driving current ratio between the two micro light emitting diodes with different light wavelengths according to the gray level, and the current density of each of the micro light emitting diodes can be reduced. Since the smaller the change of the current density, the smaller the shifting of the light wavelength (as shown in FIG. **1**), the color shift of each of the first sub-pixel **112** can be improved by substituting a single micro light emitting diode with the plurality of micro light emitting diodes with different light wavelengths. In this manner, the consistency of the light wavelength and the light intensity can be maintained under different gray level. In an embodiment, the current densities of the two micro light emitting diodes **112**A and **112**B are smaller than 3 A/cm^2 respectively, thereby improving the color shift problem.

[0033] In the micro light emitting diode display panel **100**, each of the pixels U further include a second sub-pixel **114** and a third sub-pixel **116**. The first sub-pixel **112**, the second sub-pixel **114** and the third sub-pixel **116** are sub-pixels **110** with different colors (such as red sub-pixel, green sub-pixel and blue sub-pixel). In this manner, the micro light emitting diode display panel **100** may display images in full-color.

[0034] The plurality of pixel U arranged in array to show image (FIG. **2** merely schematically illustrates four pixels U). In addition, although FIG. **2** simply illustrates four display units U electrically connected to one control element **120**, what is shown in FIG. **2** should not be construed as a limitation to the invention. In another embodiment, one pixel U or thousands of pixels U may be connected to one control element **120**.

[0035] The control element **120** controls the status (light emission, non-emission of light or light emission intensity) of each sub-pixel **110**. For example, the control element **120** may be a microchip, and the control element **120** and the micro light emitting diodes are bonded on a substrate **13**. The substrate **130** may be a printed circuit board (PCB), a flexible printed circuit board (FPCB), a glass plate having wirings or a ceramic substrate having wirings.

[0036] In the embodiment, there is only one micro light emitting diode (e.g., micro light emitting diode **114**A) in the second sub-pixel **114**, and there is only one micro light emitting diode (e.g., micro light emitting diode **116**A) in the third sub-pixel **116**. The control element **120** is further electrically connected to the micro light emitting diode **114**A in the second sub-pixel **114** and the micro light emitting diode **116**A in the third sub-pixel **116** so as to control the emission status of the micro light emitting diode **114**A and the micro light emitting diode **116**A.

[0037] For example, the first sub-pixel **112**, the second **114** and the third sub-pixel **116** may be the green sub-pixel, the red sub-pixel and the blue sub-pixel respectively. In other words, the micro light emitting diode **112**A and the micro light emitting diode **112**B are green micro light emitting diodes, the micro light emitting diode **114**A is a red micro light emitting diode, and the micro light emitting diode **116**A is a blue micro light emitting diode. Among the red light, the green light and the blue light, since human eyes are most sensitive to the green light (looks brighter under the same brightness), the color shift problem (blue shift) is significantly noticed for the green micro light emitting diode. In the embodiment, by configuring two green micro light emitting diodes with different light wavelengths in the green sub-pixel, and the ratio of the driving current of the two green micro light emitting diodes changes along with the gray level, the consistency of the light wavelength and the light intensity of the green light under different gray levels can be maintained, and therefore the micro light emitting diode display panel **100** can have good display quality. In another embodiment, the first sub-pixel **112**, the second sub-pixel **114** and the third sub-pixel **116** may be a blue sub-pixel, a green sub-pixel and a red sub-pixel respectively, or a red sub-pixel, a green sub-pixel and a blue sub-pixel respectively.

[0038] Although the first embodiment discloses that the above method for improving color shift (by disposing two micro light emitting diodes with different light wavelengths in at least one sub-pixel of each pixel, and the ratio of the driving current of the two micro light emitting diodes changes along with gray level) is only applied in one color of sub-pixel (first sub-pixel **112**), which should not be construed as limitation to the invention. In another embodiment, the method for improving color shift may also be applied in the second sub-pixel **114** and the third sub-pixel **116**.

[0039] FIG. **4** and FIG. **5** are respectively partial top views of micro light emitting diode display panels in a second embodiment and a third embodiment of the invention. Specifically, FIG. **4** and FIG. **5** respectively omit illustration of the substrate and only schematically shows one pixel U. Referring to FIG. **4**, a micro light emitting diode display panel **200** in FIG. **4** is similar to the micro light emitting diode display panel **100** in FIG. **2**, wherein the same elements are denoted by the same reference numerals, and no repetition is incorporated herein. The major difference between the two is that the second sub-pixel **114** has two micro light emitting diodes **114**A and **114**B with different light wavelengths in the micro light emitting diode display panel **200** for improving color shift.

[0040] Specifically, in the micro light emitting diode display panel **200**, the second sub-pixel **114** (e.g., red sub-pixel) includes the micro light emitting diode **114**A and the micro light emitting diode **114**B. The micro light emitting diode

114A and the micro light emitting diode 114B may have the same size so as to facilitate bonding process, which should not be construed as a limitation to the invention.

[0041] In the embodiment, the micro light emitting diode 114A and the micro light emitting diode 114B are red micro light emitting diodes. The two red micro light emitting diodes are electrically independent of each other and have different light wavelengths. The control element 120 is electrically connected to the micro light emitting diode 114A and the micro light emitting diode 114B so as to control driving currents to drive the two red micro light emitting diodes (micro light emitting diode 114A and micro light emitting diode 114B) according to a gray level of the second sub-pixel 114 (red sub-pixel), wherein a ratio of the driving current of the red micro light emitting diode 114A with larger light wavelength to the driving current of the red micro light emitting diode 114B with smaller light wavelength increases as the gray level of the second sub-pixel increases.

[0042] Referring to FIG. 5, a micro light emitting diode display panel 300 in FIG. 5 is similar to the micro light emitting diode display panel 200 in FIG. 4, wherein the same elements are denoted by the same reference numerals, and no repetition is incorporated herein. The major difference between the two is that the third sub-pixel 116 has two micro light emitting diodes 116A and 116B with different light wavelengths in the micro light emitting diode display panel 300 for improving color shift.

[0043] Specifically, in the micro light emitting diode display panel 300, the third sub-pixel 116 (e.g., blue sub-pixel) includes the micro light emitting diode 116A and the micro light emitting diode 116B. The micro light emitting diode 116A and the micro light emitting diode 116B may have the same size so as to facilitate the bonding process, which should not be construed as a limitation to the invention.

[0044] In the embodiment, the micro light emitting diode 116A and the micro light emitting diode 116B are blue micro light emitting diodes. The two blue micro light emitting diodes 116A and 116B are electrically independent of each other and controlled respectively. The micro light emitting diode 116A and the micro light emitting diode 116B have different light wavelengths in a same driving current, for example, the light wavelength of the micro light emitting diode 116A is larger than that of the micro light emitting diode 116B. The control element 120 is electrically connected to the micro light emitting diode 116A and the micro light emitting diode 116B so as to control driving currents to the two blue micro light emitting diodes (micro light emitting diode 116A and micro light emitting diode 116B) according to a gray level of the third sub-pixel 116 (blue sub-pixel), wherein a ratio of the driving current in the blue micro light emitting diode 116A to the driving current in the blue micro light emitting diode 116B increases as the gray level of the third sub-pixel 116 increases.

[0045] In summary, in the micro light emitting diode display panel of the invention, at least one sub-pixel has two micro light emitting diodes with different light wavelengths (but have the same color), and the ratio of the driving currents of the two micro light emitting diodes changes along with the gray level, such that the consistency of the dominant wavelength can be maintained under different gray levels. In this manner, the micro light emitting diode display panel can improve the color shift problem due to current density change of the micro light emitting diodes. In an embodiment, the above-mentioned method for improving color shift may also be applied to at least one of the second sub-pixel and the third sub-pixel. In addition, in each of the pixels, the arrangement of the sub-pixels with different colors, the size, and number of micro light emitting diode in each of the sub-pixels may vary according to requirement and are not limited to the illustration in FIGS. 2, 4 and 5.

[0046] Although the invention has been disclosed by the above embodiments, the embodiments are not intended to limit the invention. It will be apparent to those skilled in the art that various modifications and variations can be made to the structure of the invention without departing from the scope or spirit of the invention. Therefore, the protecting range of the invention falls in the appended claims.

What is claimed is:

1. A micro light emitting diode display panel, comprising:
a plurality of pixels, wherein one of the pixels comprises a first sub-pixel that comprises two micro light emitting diodes having different light wavelengths and controlled independently; and
a control element, controlling driving currents to the two micro light emitting diodes according to a gray level of the first sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the first sub-pixel increases.

2. The micro light emitting diode display panel according to claim **1**, wherein a light wavelength difference between the two micro light emitting diodes ranges from 1 nm to 10 nm.

3. The micro light emitting diode display panel according to claim **1**, wherein current densities of the two micro light emitting diodes are smaller than 3 A/cm^2 respectively.

4. The micro light emitting diode display panel according to claim **1**, wherein only the micro light emitting diode with smaller light wavelength of the first sub-pixel emits light when the first sub-pixel is in minimum gray level, and only the micro light emitting diode with larger light wavelength of the first sub-pixel emits light when the first sub-pixel is in maximum gray level.

5. The micro light emitting diode display panel according to claim **1**, wherein the first sub-pixel is a green sub-pixel and the two micro light emitting diodes are green micro light emitting diodes.

6. The micro light emitting diode display panel according to claim **1**, wherein the one of the pixels further comprises a second sub-pixel and a third sub-pixel, and the first sub-pixel, the second sub-pixel and the third sub-pixel are with different colors.

7. The micro light emitting diode display panel according to claim **6**, wherein the third sub-pixel only comprises one micro light emitting diode, the second sub-pixel comprises two micro light emitting diodes having different light wavelengths and controlled independently, and the control element controls driving currents to the two micro light emitting diodes of the second sub-pixel according to a gray level of the second sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the second sub-pixel increases.

8. The micro light emitting diode display panel according to claim **6**, wherein the first sub-pixel, the second sub-pixel and the third sub-pixel are respectively a green sub-pixel, a red sub-pixel and a blue sub-pixel, the red sub-pixel comprises two red micro light emitting diodes controlled independently and with different light wavelengths, the control element controls driving currents to the two red micro light emitting diodes according to a gray level of the red sub-pixel, wherein a ratio of the driving current of the red micro light emitting diode with larger light wavelength to the driving current of the red micro light emitting diode with smaller light wavelength increases as the gray level of the red sub-pixel increases, the blue sub-pixel comprises two blue micro light emitting diodes controlled independently and with different light wavelengths, the control element controls driving currents to the two blue micro light emitting diodes according to a gray level of the blue sub-pixel, wherein a ratio of the driving current of the blue micro light emitting diode with larger light wavelength to the driving current of the blue micro light emitting diode with smaller light wavelength increases as the gray level of the blue sub-pixel increases.

9. A driving method of a micro light emitting diode display panel, comprising:

providing a micro light emitting diode display panel, having a plurality of pixels and at least a control element electrically connected to the pixels, wherein one of the pixels comprise a first sub-pixel that comprises two micro light emitting diodes controlled independently and with different light wavelengths; and

controlling driving currents to the two micro light emitting diodes via the control element according to a gray level of the first sub-pixel, wherein a ratio of the driving current of the micro light emitting diode with larger light wavelength to the driving current of the micro light emitting diode with smaller light wavelength increases as the gray level of the first sub-pixel increases.

10. The driving method of the micro light emitting diode display panel according to claim **9**, wherein the driving current of the micro light emitting diode with larger light wavelength is I2, the driving current of the micro light emitting diode with smaller wavelength is I1, a ratio of I1 to I2 satisfies:

$$I1/I2=(W2-W)/(W-W1);$$

wherein W is a target peak wavelength of the first sub-pixel, W1 and W2 are peak wavelengths of the two micro light emitting diodes respectively when the two micro light emitting diodes are driven by I1 and I2, and W1<W2.

11. The driving method of the micro light emitting diode display panel according to claim **9**, wherein current densities of the two micro light emitting diodes are smaller than 3 A/cm^2 respectively.

* * * * *

专利名称(译)	微发光二极管显示面板及其驱动方法		
公开(公告)号	US20190073944A1	公开(公告)日	2019-03-07
申请号	US16/121634	申请日	2018-09-05
[标]申请(专利权)人(译)	錼创科技股份有限公司		
申请(专利权)人(译)	PLAYNITRIDE INC.		
当前申请(专利权)人(译)	PLAYNITRIDE INC.		
[标]发明人	LI YU CHU		
发明人	LI, YU-CHU		
IPC分类号	G09G3/32 H01L25/075 H01L27/15 G09G3/20		
CPC分类号	G09G3/32 H01L25/0753 H01L27/156 G09G3/2003 G09G2310/0264 G09G2300/0443 G09G2300/0452 G09G2320/0242		
优先权	106130555 2017-09-07 TW		
外部链接	Espacenet USPTO		

摘要(译)

提供一种包括多个像素和控制元件的微发光二极管显示面板。像素之一包括第一子像素。第一子像素包括具有不同光波长并且独立控制的两个微发光二极管。控制元件根据第一子像素的灰度级控制到两个微发光二极管的驱动电流，其中微发光二极管的驱动电流与较大的光波长的比率与微光的驱动电流的比率随着第一子像素的灰度级增加，具有较小光波长的发光二极管增加。还提供了一种微发光二极管显示面板的驱动方法。